

Application/Control Number: 09/870,085

Art Unit: 0

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CM.

1. (Previously Presented) A method of manufacturing a semiconductor device in which a semiconductor element is formed in a semiconductor substrate, including selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate, wherein a film formed on the peripheral portion and the beveled portion is removed under a condition that the film has non-selectivity to the target substrate.

CLAIM 2. (CANCELLED)

3. (Currently Amended) The method of manufacturing a semiconductor device according to claim 1, wherein selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate is carried out, after a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate and then forming at least a surface protecting film is carried out on the main surface of the target substrate, ~~following that a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate.~~

4. (Previously Presented) The method of manufacturing a semiconductor device according to claim 1, wherein selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate is carried out after covering a portion other than the peripheral portion and the beveled portion on the main surface of the target substrate with a resist film, selectively grinding or polishing the peripheral portion and the beveled portion being carried out following that a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate.

CLAIMS 5-6. (CANCELLED)

CLAIMS 7-22. (CANCELLED)

CLAIMS 23-27. (CANCELLED)

28. (Previously Presented) The method of manufacturing a semiconductor device according to claim 27, wherein the anisotropic dry etching treatment is carried out so as to form a trench in the semiconductor substrate.

29. (Previously Presented) The method of manufacturing a semiconductor device according to claim 28, wherein the trench is used for forming a trench capacitor formed on the semiconductor substrate.

30. (Currently Amended) A method of manufacturing a semiconductor device comprising:

forming an insulating film on a main surface of a semiconductor substrate;

applying an anisotropic etching to the insulating film and the semiconductor substrate so as to form a trench in the semiconductor substrate;

depositing a polysilicon film on the main surface of the semiconductor substrate and in the trench; and

after depositing the polysilicon film, selectively grinding ~~or~~ and polishing the peripheral portion and a beveled portion on the main surface side of the semiconductor substrate, wherein the insulating film remaining on the peripheral portion and the beveled portion is removed under a condition that the insulating film and the polysilicon film have has non-selectivity to the semiconductor substrate.

CLAIMS 31-33. (CANCELLED)

34. (Currently Amended) The method of manufacturing a semiconductor device according to claim 1, wherein selectively grinding or polishing the peripheral portion and the beveled portion is carried out, while remaining a diameter of said semiconductor substrate substantially unchanged, to remove the film formed on the peripheral portion and the beveled portion and deep and irregular uneven portion formed in the peripheral portion and the beveled portion.

35. (Previously Presented) A method of manufacturing a semiconductor device in which a semiconductor element is formed in a semiconductor substrate, including selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate, wherein at least an uppermost layer of multi-layered films formed on the peripheral portion and the beveled portion is removed under a condition that the at least uppermost layer of multi-layered films has non-selectivity to a layer of the multi-layered films which is under the at least uppermost layer of multi-layered films.

36. (Currently Amended) The method of manufacturing a semiconductor device according to claim 35, wherein selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate is carried out, after a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate and then forming at least a surface protecting film is carried out on the main surface of the target substrate, ~~following that a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate.~~

37. (Previously Presented) The method of manufacturing a semiconductor device according to claim 35, wherein selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate is carried out after covering a portion other than the peripheral portion and the beveled portion on the main surface of the target substrate with a resist film, selectively grinding or polishing the peripheral portion and the beveled portion of the target substrate being carried out following that a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate.

CLAIM 38. (CANCELLED)

39. (Currently Amended) The method of manufacturing a semiconductor device according to claim 38, wherein the anisotropic dry etching treatment is carried out so as to form a trench capacitor in the semiconductor substrate.

40. (Previously Presented) The method of manufacturing a semiconductor device according to claim 39, wherein the trench is used for forming a trench capacitor on the semiconductor substrate.

41. (Currently Amended) The method of manufacturing a semiconductor device according to claim 35, wherein selectively grinding or polishing the peripheral portion and the beveled portion is carried out, while remaining a diameter of said semiconductor substrate substantially unchanged, to remove the film formed on the peripheral portion and the beveled portion and deep and irregular uneven portion formed in the peripheral portion and the beveled portion.

42. (Previously Presented) A method of manufacturing a semiconductor device in which a semiconductor element is formed in a semiconductor substrate, including selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate, wherein multi-layered films formed on the peripheral portion and the beveled portion are removed under a condition that the multi-layered films have non-selectivity to the target substrate.

43. (Currently Amended) The method of manufacturing a semiconductor device according to claim 42, wherein selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate is carried out, after a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate and then forming at least a surface protecting film is carried out on the main surface of the target substrate, ~~following that a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate.~~

44. (Previously Presented) The method of manufacturing a semiconductor device according to claim 42, wherein selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate is carried out after covering a portion other than the peripheral portion and the beveled portion on the main surface of the target substrate with a resist film, selectively grinding or polishing the peripheral portion and the beveled portion being carried out following that a deep and irregular uneven portion is formed in the peripheral portion and the beveled portion of the target substrate.

CLAIM 45. (CANCELLED)

46. (Currently Amended) The method of manufacturing a semiconductor device according to claim 45, wherein the anisotropic dry etching treatment is carried out so as to form a trench capacitor in the semiconductor substrate.

47. (Currently Amended) The method of manufacturing a semiconductor device according to claim ~~[[44]]~~ 46, wherein the trench is used for forming a trench capacitor on the semiconductor substrate.

48. (Currently Amended) The method of manufacturing a semiconductor device according to claim 42, wherein selectively grinding or polishing the peripheral portion and the beveled portion is carried out, while remaining a diameter of said semiconductor substrate substantially unchanged, to remove the film formed on the peripheral portion and the beveled portion and deep and irregular uneven portion formed in the peripheral portion and the beveled portion.

49. (New) The method of manufacturing a semiconductor device according to claim 3, wherein the surface protecting film is a polysilicon film, and further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the polysilicon film on a portion of the main surface of the target substrate, which is other than the peripheral portion and the beveled portion, while remaining the polysilicon film in a trench formed in the substrate.

50. (New) The method of manufacturing a semiconductor device according to claim 3, wherein the surface protecting film is a resist film, and further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the resist film on a portion of the main surface of the target substrate, which is other than the peripheral portion and the beveled portion.

51. (New) The method of manufacturing a semiconductor device according to claim 30, further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the polysilicon film on a portion of the main



surface of the target substrate, which is other than the peripheral portion and the beveled portion, while remaining the polysilicon film in the trench.

52. (New) The method of manufacturing a semiconductor device according to claim 36, wherein the surface protecting film is a polysilicon film, and further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the polysilicon film on a portion of the main surface of the target substrate, which is other than the peripheral portion and the beveled portion, while remaining the polysilicon film in a trench formed in the substrate.

53. (New) The method of manufacturing a semiconductor device according to claim 36, wherein the surface protecting film is a resist film, and further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the resist film remaining on a portion of the main surface of the target substrate, which is other than the peripheral portion and the beveled portion.

54. (New) The method of manufacturing a semiconductor device according to claim 43, wherein the surface protecting film is a polysilicon film, and further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the polysilicon film remaining on a portion of the main surface of the target substrate, which is other than the peripheral portion and the beveled portion, while remaining the polysilicon film in a trench formed in the substrate.

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55. (New) The method of manufacturing a semiconductor device according to claim 43, wherein the surface protecting film is a resist film, and further comprising, after grinding or polishing the peripheral portion and the beveled portion, removing the resist film on a portion of the main surface of the target substrate, which is other than the peripheral portion and the beveled portion.